

ABSTRACT OF THE DISCLOSURE

Methods for forming metal lines in semiconductor devices are disclosed. One example method may include forming a lower adhesive layer on a semiconductor substrate; forming a metal layer including aluminum on the lower adhesive layer; forming an anti-reflection layer on the metal layer; forming a photomask on the anti-reflection layer; performing an initial etching, a main etching and an over-etching for the anti-reflection layer, the metal layer and the lower adhesive layer, respectively, in a region which is not protected by the photomask, using C_3F_8 as a main etching gas; and removing the photomask residual on the anti-reflection layer.